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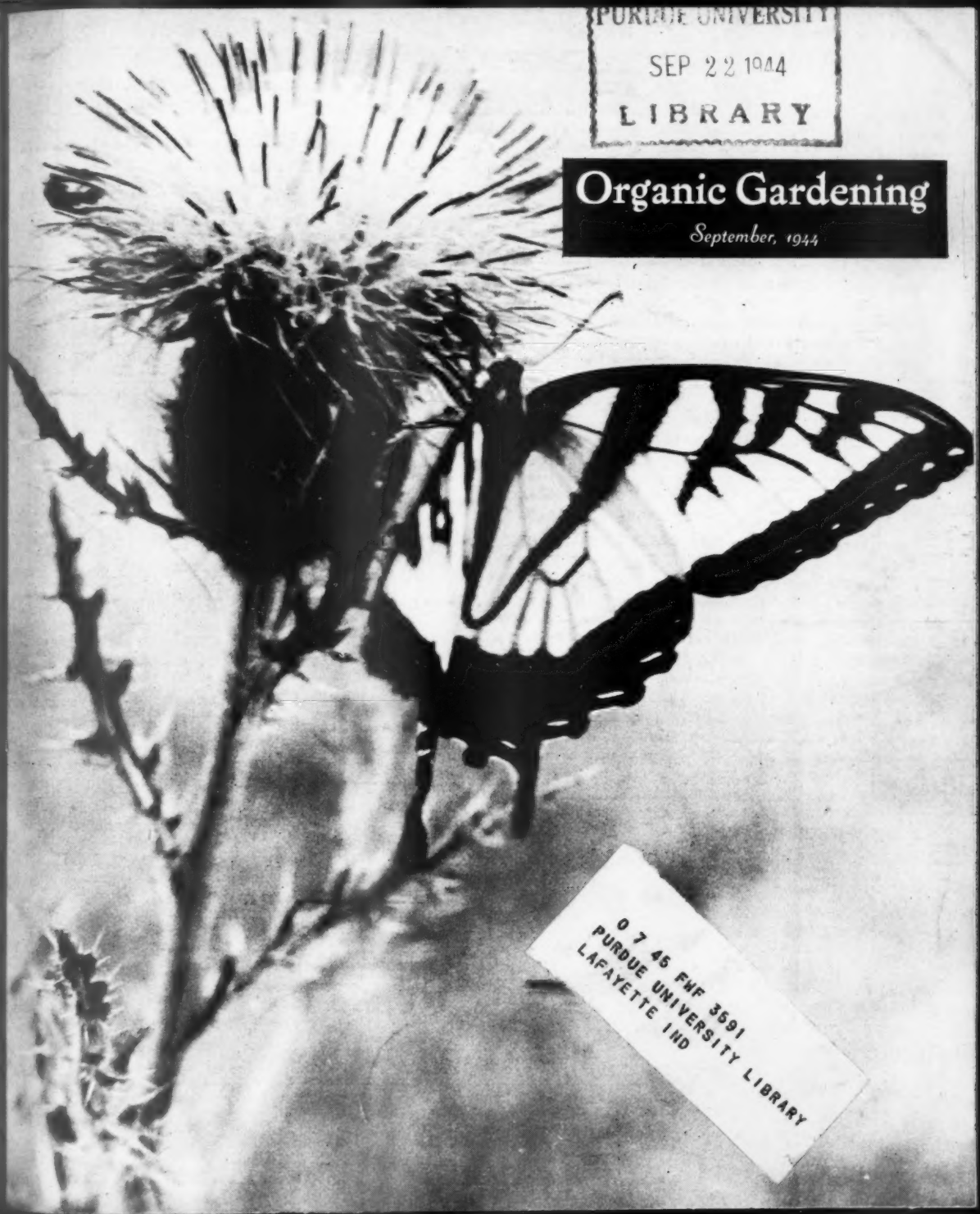

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J. I. Rodale, Editor — Sir Albert Howard, C.I.E., M.A., Associate Editor

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With The Editor

Advantages of Compost Farming

THERE are 40 reasons which will be enumerated in this article as to why compost farming is superior to farming or gardening with artificial fertilizers. When anyone says that making compost heaps is too much work they overlook the fact that that work is not extra; that is, to be added to the sum total of the work on the farm. It is work that is taken from other operations on the farm, as will be seen, so that with the lapse of a few years the total work will be actually less than before. The advantages, as enumerated, will be numbered.

1. *The general fertility level of the farm or garden is greatly improved.*

2. *It improves the soil's mechanical structure* which includes its granulation, tilth and increase of pore spaces. It is a great improver of heavy clay soils. Sandy soils are made more cohesive.

3. *It makes for an ease of cultivation of the soil.* Individual cases show that where it used to take nine hours to hand hoe an acre of potatoes, it now takes only seven hours. Another case showed that where it used to take four days to hoe beet fields, with the softer, looser organically treated soil it now takes only 2.9 days (Dr. Pfeiffer). On a 437 acre farm, operated by this method without any chemical fertilizers, the farmer was able to dispense with one team of horses, with the resultant saving in feed, stable space, grooming labor, etc. Does this counteract the labor of making compost heaps?

4. *It eliminates valuable waiting time.* The farmer can get back onto the soil quicker after a rain. Because of the spongy porous soil structure there is less mud and stickiness, or soil breaking into clods. The soil is more

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mellow. Gardens that were formerly too "sticky" to work when wet—and which immediately baked hard as brick, and formed large cracks in the surface which dried out the soil, became a pleasure to work after being handled in the organic manner. The hand cultivator pushes through the soil much more easily. Where land has been treated with artificials, and gets the benefit of only occasional and small amounts of organic matter it tends to become harder and harder. A neighboring farm-hand told me recently that the soil on his farm was gradually getting like concrete and was becoming more and more difficult to work.

5. *It increases the soil's water-holding capacity.* Estimates go all the way from a 20% to 50% increase in the soil's ability to absorb rain water.

6. *It prevents soil erosion and reduces flood hazards.* I have seen the benefits on my own farm where the water, in heavy rains, does not come dashing along with any where near the volume or violence that it used to. A great deal of money could be saved in engineering devices such as the building of drains, dams, terracing, etc., if farmers were to improve the structure of their soil by using more compost on their lands. Does this counteract the labor of making compost heaps?

7. *It prevents hardening of the surface soil by dashing rains.* It is a peculiar characteristic of soil, but where it is hard and has poor mechanical structure, the impact of a dashing rain will create a hard crust. The porous, spongy structure of an organic soil prevents this. On some farms you can actually pick up large hard crusts from the soil surface.

8. *The earthworm multiplies greatly,* because organic matter is its natural food. Artificials kill or drive them away. The earthworm is a great friend of the farmer, aerating the soil and actually manufacturing top-soil. Earthworms have been known to add 1/5th of an inch of top-soil in only one year.

9. *It multiplies the microbial population of the soil.* Bacteria, fungi, etc. increase tremendously when soil is enriched organically, aiding the growing processes enormously. The more aerated soil and better moisture conditions greatly encourage their increase.

10. *Land can safely be plowed more deeply.* Where land is organically rich and has the proper mechanical structure, you can do almost anything with it. The top-soil becomes thicker. You can plow deeper.

11. *Hard-pans will not form.* If there is a hard-pan it will gradually disappear, especially with the aid of earthworms who will gradually crumble it up. When we first purchased our farm there was one depression where rain-water accumulated and didn't seep into the ground for days, due to such a hard pan. Now this never occurs at that spot.

12. *There is no danger of a plow-sole.* The same tendency of chemicalized soils which make them bake hard, form clods, etc. creates a plow-sole at the point where the plow shears the soil. This is a hard pan-like formation. This does not occur in an organic soil because of its softness and mechanical structure.

13. *Heavy machinery does not compact the soil as much.* An organic soil has a springiness which makes it rebound after the weight is removed. On soils that are hard-packed the weight of tractors, trucks and heavy combines further compact the soil, thus reducing its aeration and its general quality.

14. *The soil has much better aeration.* This is quite obvious and is one of the most important requirements for optimum soil fertility. Aeration is made possible by the proper crumb structure of the soil as well as by the burrows of earthworms. The pore spaces permit a greater surface for the film of soil water to adhere to. In well-aerated soils ground air is kept in motion by the wind blowing on the surface. Such air movement keeps a check on pathogenic (dangerous) bacteria in the soil. Good aeration is necessary for the proper development of roots. Some soils suffer from asphyxiation and the roots practically strangle. This has been proven to be a specific cause of plant disease.

15. *Soil made darker by humus absorbs heat more effectively.* This is a principle of color in insulation. White keeps heat away and the darker the color becomes the more heat it absorbs. This enables the land to warm up much earlier in the spring so that work can start and seeds begin to germinate. The bacteria start working as soon as the temperature goes up in the spring. The amount of moisture and air space in the soil also has an important bearing on soil temperature.

16. *Dry weather advantages.* Ordinarily just as one daren't plow when the soil is too wet, one cannot plow also when it is too dry or the soil will form clods. The organic system which stores up moisture doesn't have this disadvantage. In dry weather the land cools sooner in an organic soil, and more dew is precipitated. Under drought conditions an organic soil will fare much better due to its stored up water.

17. *It may actually improve*

the rain conditions. Robert H. Elliot in "The Clifton Park System of Farming", (Faber and Faber—London) who followed the organic system, with the addition of a method of growing deep-rooted crops such as chicory and orchard grass, etc., says, "It is important to note too that the air passing over a humus-fed soil, would be cooler and moister than air passing over a mineralized soil. The dewfall therefore would be greater and when the land throughout the country becomes generally humus-fed, the rainfall would be more advantageously distributed, and fall over a greater number of days in small showers instead of heavy falls of rain, as in the case when land is clothed with forest."

18. *It transpires less water through the leaves.* In other words not only does it store more water, but it gives up less of it than a hard-packed soil. As a rule it requires several hundred pounds of water to be lost or transpired through the leaves of a plant for every pound of dry matter produced. In Nebraska Agr. Exp. Sta. Res. Bulletin No. 6 (1915) it is shown that on good soil, well-manured, the loss of water is only about a half of what it is on an unmanured soil. This is a point of terrific significance.

19. *The manure produced from cattle fed on an organically operated soil improves in quality from year to year.* It becomes progressively richer so that eventually less is required. Where ten tons of compost may be needed per acre in the first five or six years, later on 5 tons is sufficient. In about fifteen years a point is usually reached where the farm or garden can get along without any fertilizer help whatever for a few years. Manure from a chemicalized farm has far less value.

20. *By making compost according to the Howard process, it increases the available manure by 300 per cent.* This is obvious, since ordinarily only the available manure would be used whereas by our process six inches of grass, leaves, weeds, etc. must be used for every two inches of stable manure. Manure itself is not a complete plant food but the addition of the green matter makes it a well-rounded out soil amendment.

21. *Compost heaps preserve all the food elements in the manure.* Due to the manner in which the green matter, manure, earth and ground limestone are interlayered in the compost heap, there is little loss whereas in the old-fashioned manure heap, sometimes more than half the values are leached out. The Howard type compost heap is made in a manner that takes advantage of the natural action of soil bacteria, fungi, etc There are also no smells or flies as found in manure piles.

22. *Composts have a residual effect.* In experiments with ordinary manure 40% was used the first year, 24% the second, 15% in the third and 13% in the fourth year. But in using composts some residual effects were felt as much as 15 years later. This builds up what farmers call high condition.

23. *When following the organic system your grounds look neater.* The weeds are cut down for use in the making of compost. Weeds also harbor insect eggs, spores and other disease organisms. Also, the weeds do not go to seed to reproduce themselves.

24. *The weed menace is greatly reduced.* Many weeds grow only in infertile soils, strange as this may seem. Some grow only in acid soils. An organically operated farm or garden eventually keeps the weeds down within reason. This is not theory but is based on actual results obtained. I have seen it on our own farm.

25. *Weeds can be cultivated more easily out of an organic soil.* In the soft crumbly, organic soil, the hoe or cultivator pulls the weeds out more easily. You don't have to wait until after a rain to weed. In a chemicalized soil the weeds in dry weather seem to be embedded in cement.

26. *Compost is a "safer" material than just ordinary stable manure.* In tomatoes, for example, the use of raw manure in many cases results in maximum stalk and plant growth but minimum fruit. Compost is a finished material whereas raw manure has to be worked on by soil organisms to break it down with resultant bad effects on the crop.

27. *Compost kills out weed seeds.* In applying raw manure to the land the farmer and gardener are actually, in many cases, planting a crop of weeds. In the compost heap, the fermenting action kills off the weed seeds.

28. *In the long run yields are greater by the organic method.* This may take a few years to accomplish but often when a substantial amount of well-made compost is applied the first year the yield is surprisingly large. On our farm we planted 21 acres of corn the first year. In the second year 14 acres gave us the same production as the first 21 acres. In the third year we got just as much production of corn out of about 11 acres. There are many other cases showing even better results.

29. *There is less risk of crop failures.* Due to the complications involved in the use of chemical fertilizers, more plant diseases, too acid condition from over use of chemicals, etc. there is an occasional crop failure. Storms blow down stalks of corn and sunflowers and cereal plants such as wheat, oats, barley, etc. This practically never happens where the soil is rich in humus and where plants are accordingly strong and healthy enough to stand on their own legs.

30. *There is very little plant disease.* In chemicalized farming and gardening the plant is not nourished properly and thus its resistance is low just as some persons whose bodily resistance is low and disease gets them whereas healthy individuals may come in contact with the same germs and be immune. There are many other factors but crops raised with plenty of compost seem to be subject to very little disease. Waksman in his book *Humus* (Williams and Wilkins) says, "Plant deficiency diseases are usually less severe in soils well supplied with organic matter, not only because of the increased vigor of the plants but also because of antagonistic effects of the various soil microorganisms which become more active in the presence of an abundance of organic matter."

31. *The insect menace is reduced to a minimum.* For the same reason as (30) insects do not attack healthy plants. Insects are selective in their tastes and seem to have been trained by Nature to eat more or less imperfectly grown plants. It is a method in Nature's bag of tricks to do away with the unfit. Plants grown with chemicals are not 100% healthy, it would seem, and thus seem to attract insects. This works out amazingly in practice and is nothing short of miraculous.

32. *No poison sprays are needed.* On farms and gardens where the organic method is practiced no poison sprays are used on vegetables and potato plants because insect and disease trouble are down to a minimum. Large amounts are thus saved for sprays not purchased and for spray equipment as well as the labor involved and the turning out of foods poisoned by these sprays.

33. *No chemical treatments are needed for seeds.* Chemicalized farming seems to produce seeds which harbor the organisms of disease so that modern agricultural and even gardening practice demands that all seeds be given a poison bath to kill them off. Some of this is absorbed into the plant. This practice is not necessary on the organic farm or garden.

34. *The eating of food raised with chemical fertilizers brings about diseases in human beings.* In an English school where food was raised by the Sir Albert Howard method there was soon a great improvement in the health of the children. In Singapore a similar experiment conducted with a few hundred coolies produced similar results. There are many other cases on record which would seem to indicate that the use of humus produces the old-fashioned food rich in vitamins and minerals. There would be a tremendous saving in doctor bills if all our food was raised by this method.

35. *Farm animals fed on organically produced feeds are healthier.* Sir Albert Howard fed cattle on feeds raised with humus. He allowed them to rub noses with a neighbor's cattle that had the highly contagious hoof-and-mouth disease. His animals did not catch the disease. There is absolute proof that our terrible conditions of disease of all kinds of farm animals is to a great extent due to their being fed with the devitalized feeds raised with chemical fertilizers.

36. *Foods raised organically taste better.* Modern foods grown commercially are losing their old-time taste. Vegetables raised with chemicals are tougher and more fibrous and do not have the full-bodied taste that food has which is raised with compost. Wines in certain sections of France for that reason are famous for their wonderwul taste. Recently in New Zealand it was found that the cheese tasted better. It was found that this was due to the use of less chemical fertilizers due to war-time difficulties and restrictions.

37. *The general quality of the crop is much higher.* In England a wealthy farmer who owned many thatched-roof cottages discovered that straw from organically grown crops lasted twice as long, as a roof, than ordinary straw. In France hay growing in certain sections where practically no chemical fertilizers are used command a big premium and are shipped long distances for use by race horses. The keeping quality of foods grown organically is far superior. Nowadays when a pumpkin is grown with chemical fertilizers it gets mouldy a few days after it is cut open.

38. *Seeds are stronger and germinate better.* It has been proven that the use of artificial fertilizers adds a greater percentage of inorganic minerals to the plant whereas the use of humus gives the plant more of the minerals in organic form. The plant gives as much of the organic minerals to the seed as

Where chemicals are used there is a smaller amount of organic minerals in the seed than where the organic fertilizing method is followed. This is the prime reason for the running out of the variety wherever chemical fertilizers are consistently used.

39. *It improves the extent of the roots of plants.* The open soil structure enables the roots not only to penetrate more deeply but to spread out laterally. We reproduced pictures in Organic Gardening, taken by Lady Eve Balfour, showing how much thicker the roots were of a plant grown in organic soil as against one in a chemical one. The importance of the extent of root structure to the welfare of the plant can be well appreciated.

40. *Humus seems to counteract the effects of poisons in the soil.* Waksman in "Humus" (Williams and Wilkins) says, "The toxicity of plant poisons becomes less severe in a soil high in humus than in a soil deficient in humus; high salt concentrations are less injurious; and aluminum solubility and its specific injurious action are markedly decreased."

There are at least a dozen more reasons, some of them quite technical. There are some reasons we don't even know about yet, but it all shows how ridiculous it is for anyone to say that the organic method is impractical because it requires a little extra work to make the compost heaps. This statement is usually made by persons who do not realize all the other advantages and savings in the equation.

While a farmer is applying chemicals to wheat seeds, a thing which is unnecessary if he was running a 100% organic farm, he could be turning over a compost heap. While he is spraying his fruit orchard he could be making five or ten heaps, depending on the size of the orchard. While he is sitting up with a sick cow he is losing valuable energy which could be used in the compost-making department. While he is sitting and fretting in the spring because his land is too wet and cold to start plowing he could be making compost heaps. And so the story goes all the way down the line. Compost farming does not mean more work. It means less work.

J. I. RODALE.

Acid And Alkaline Conditions

A READER has requested a list of acid and alkaline loving vegetables. The following is a list as given by Bear. Also a paragraph from Cornell Extension Bulletin No. 344 by way of explanation.

Personally, I think this matter of soil pH is rather overdone. After all, the condition of the soil is so swiftly changed by cultivation, so quickly corrected by the proper application of good composted humus, that no given garden site can be definitely fixed as far as acidity is concerned.

"Safe soil pH's for Important Crop Plants:"

pH 5.0	pH 5.5	pH 6.0	pH 6.5
Beans	Corn	Cabbage	Asparagus
Cowpeas	Cucumbers	Kale	Beets
Peanuts	Strawberries	Cauliflower	Celery
Potatoes	Tomatoes	Turnip	Lettuce
Watermelons			Onions
			Peppers
			Spinach

"Acidity is usually expressed by the symbol pH. . . . . Most vegetables grow well where the soil has a reaction of pH 6.0 to 6.8, that is, they develop best in slightly acid soil. A soil pH of 7.0 is neutral, 6.0 is acid, 8.0 is alkaline."

In practice, I think most gardeners regard 5.0 and 5.5 as acid and 6.0 and 6.5 as alkaline since only a little lime is needed on 6.0 and none at all on 6.5 soils.

Hints For The Victory Gardener

This is the twenty-second of a series of articles by this author dealing with the cultivation of ordinary vegetables.

BY ROGER W. SMITH

SWEET POTATOES

AMBITIOUS Victory gardeners have done much to demonstrate the possibility of successfully growing this very valuable vegetable much farther north than was formerly thought possible. You may reap the rewards of their work by setting out, under proper conditions, southern grown sweet potato plants with much assurance. Before you start, however, it is best to have some knowledge of the nature of the plant.

The sweet potato is the edible root of a creeping vine of the Morning Glory family. This vine is of tropical American origin and had been long cultivated in both hemispheres when authentic records began. Under very favorable conditions it occasionally grows to such perfection that it forms a flower not unlike the trumpet of the white morning glory.

Some confusion exists between the yam and the sweet potato because many large sweet potatoes are commonly known as yams on the market. However, the real yam is the edible root of a climbing tropical plant different from the sweet potato although its roots bear some resemblance.

A warm, sandy, well drained and well aerated soil is best for sweet potatoes provided it contain ample mellow, organic materials. The organic material is best supplied by the addition to the soil of a considerable amount of mature compost humus. Well rotted manure may be added if the supply of composted material is inadequate.

In very heavy soils, of course, clean sand should also be used to improve soil texture. But if you plan a new garden in a soil which is rather light (sandy) the sweet potato is the answer to your question which root vegetable is best to plant for the sweet potato thrives best in newly dug ground in which a large amount of green manure or other organic materials have been incorporated with sandy soil.

The sweet potato introduces you to quite a new problem in root vegetables. You meet a vine which produces an edible root. An unusual combination. In order to cause the plants to form plenty of large, edible roots it is necessary that you see to it that the plants do not form an excessive amount of vegetative growth at the expense of the root formation. Generally, this will not happen unless excessive moisture is applied to the plant during its earlier growth. To your advantage is the fact that the plant is practically drought proof although it is very sensitive to cold.

Most garden soils are fairly well suited to sweet potatoes. Very surprising results have often been obtained from growing this plant in ordinary, well-tilled land which had received a generous amount of organic manure.

The important thing in growing sweet potatoes is to get the young plants set and growing just as early as possible after all danger of frost has passed and to provide them with necessary plant nutrients.

Along the rows where the plants are to grow it is best to lay down at least one inch of well made compost humus. After this has been lightly dug into a properly prepared soil it is best to draw the soil up into wide ridges about three feet apart. The young plants should be set about fourteen inches apart along these ridges which will provide good drainage and make for fine roots.

Because the young plants are very susceptible to cold they may need some protection when set out very early. Until hot weather arrives they should be covered during cold nights. Paper bags, boxes, cartons, practically anything that will retain heat may be set over the transplants before nightfall and removed in the morning.

Cultivation is necessary to keep down weeds only until the vines cover the space between the rows. Mulching with com-

post humus placed around the plants or along the rows will do much to keep down weedy growth and aid the plants.

Sweet potatoes are much damaged by plant disease. This trouble they frequently bring with them as transplants. However, healthy transplants grown in good, well drained soil augmented with healthy compost humus are seldom much bothered with either insect pests or plant disease.

When the first touch of frost has placed its signature across your garden you should begin to make arrangements for the digging of the tubers. The first fine day after frost is the best day to dig your crop. The tubers are best lifted with a spading fork being careful to injure them as little as possible.

The proper treatment of the roots after digging is important. They should be allowed to dry for three or four hours in a shaded, warm place when they may be moved to a well ventilated room and spread out to "cure" for several days. The object of the curing process is to allow the juices exuding naturally around areas of minute injuries to seal these injuries and in general to make the root immune to damaging mould growth.

Sweet potatoes are best cured at temperatures between 80 and 90 degrees. Often a small crop may be easily cured by arranging them around the kitchen stove. After the curing process is complete the roots may be stored in any place around the house which has a moderate temperature, between 50 and 55 degrees Fahrenheit.

If you wish especially large roots to be used in shows, some planning is necessary. The plants should be set out very early in soil well supplied with compost humus. Large quantities of wood ashes should be dug in lightly and plenty of water should be available to the plants in a slow stream. Everything possible should be done to see that the plants are well started, well grown, and that they are permitted to continue steady growth until cut down by frosts.

In this way you may succeed in producing exceptional sweet potatoes the envy of your neighbors and the admiration of your friends. But whether you grow this excellent vegetable as an experiment or whether you grow it and store it in the house for its food value—sweet potatoes contain more than 100 times more Vitamin A than white potatoes—your family will enjoy the experience. They will be better fed during the long winter months.

And in the growing and use of this fine plant form you will have learned much about the great value the use of organic compost humus plays in the formation of healthy plant growth.

In My Garden

By far the most fertile patch in the garden is a rectangle used a few years ago as a compost pit. From sheer laziness it was made shallow and not piled high. The top was levelled and covered with a thin layer of soil, in which mushrooms were grown. As the rectangle was alongside an existing bed, it was never exhumed, but left to enlarge the garden area. Lettuces grown there are peculiarly sweet and large-hearted (or magnanimous) and the same may be said of a few spring cabbages; and one slip used as a seed-bed for leeks has proved ideal for the purpose. Just as that farming genius, Mr. Hosier, fertilises his shallow downs by moving his poultry progressively across them, so perhaps we might go through our vegetable gardens by a succession of shallow compost pits. It is a garden crime to burn any tolerably soft leaf, say of rhubarb or cabbage; and if the softer leaves only are used in such places, the ground is fit for use within a comparatively few months. Such a site is ideal for cauliflower, which, like a pumpkin, seems to grow with extra freedom on almost earthless humus, if such a contradiction in terms is allowed. I have seen market gardeners—in the Biggleswade are—burying bundles even of twitch deep under their plots, as purely local compost.—W. Beach Thomas.—*The Spectator* (England).

Advice

The most amazing situation of all is that those who start gardening rarely abandon it. Dieticians repeatedly tell us that vegetables lose much of their virtue if much time elapses between the harvesting and the eating. They also assure us that in case of sweet corn a definite chemical change occurs within two hours of the picking. Trying to convince our people of these facts is as difficult as trying to tell a housewife, who has had thirty years open kettle experience canning vegetables, that she is dangerously exposing her family to the deadly toxin of botulism by not using the pressure cooker method.

In the development of the art of living we must be ready to change our views in order to take advantage of all facts designed to an improved health. Try growing your own vegetables, harvest them judiciously, eat them fresh daily, and be healthy and happy —*eat to live.*—Orrin Hale.—*Northwest Gardens and Homes.*

Sunflower Seed Notes

A. F. A. Koening of Bradington, Fla., writes: "My bleeding gums were cleared up after we made bread from Kimberton's Bio-Dynamic grown wheat, grinding it as needed in a handmill. Tried to get some sunflower seeds down here but it is all dried up stuff with nothing but fibre shell."

A friend relates that in the old Czarist days in Russia, the iron rations of every soldier consisted of a bag of sunflower seeds weighing one kilogram (about 2 1/5 pounds). The soldier sometimes lived exclusively on these seeds.

Dr. Juan Amon-Wilkins of the Natural School, Isle of Pines, Cuba, writes (May 20, 1944): "I agree with your findings on the sunflower. My mother, a medical woman too, as well as my father, told me as a boy about the value of the sunflower for teeth and bones, as well as the nerves. We plant them here, and they grow and produce well."

One of the girls who was used as a guinea-pig in taking sunflower seeds to clear up bleeding-gums, states her gums became noticeably pinker in color. She states also that it removed a severe case of coating of the tongue. When she stopped taking the seeds the coating returned.

The Naturopath Magazine for June, reprinted the article on sunflower seeds which ran in the May issue of Organic Gardening. The editor writes, "When you want to you can swing from the floor and land an honest-to-goodness jolt. This is one." This article has also been reprinted in the current issue of the *News Letter on Compost*, published in England. It is also soon to be reprinted in *Diet Digest*.

A reader advises that in the Dakota territory, farmers stemming from Russian, German and Slavic sections of Europe go in for sunflower growing in a big way as they know its value. They call the sunflower-seed "Russian Peanuts."

A manufacturer of chewing gum made with chlorophyll writes, "Have read with considerable interest the article on sunflower seeds and marvel at what you have discovered." (We had to compromise with our sense of modesty in publishing this sentence). "Personally, I attribute much of your good findings to Vitamins A and D,—notably D, as you well relate, is built up by long sunlight upon the oil." This manufacturer is seriously considering the addition of ground up sunflower seed to his product and experimental work will be done. No orders can be taken for his present product as their orders are far ahead of their production.

Sunflower seeds helped these people.

Since our original article drawing attention to the curative powers of sunflower seeds was published (April, 1944) three letters have been received from readers drawing attention to help obtained from eating the seeds.

F. C. Rodman of Dover, New Jersey, writes on June 28, 1944, "eating the seed, I believe has cleared the dermatitis from Ivy contact." I have often thought that the reason some people seem to be immune to poison ivy is that they have a tougher, healthier skin that resists the burn of the ivy. The vitamins, minerals and oils in the sunflower seeds must help to build up the skin.

Roland L. Dempsey of Fitchburg, Mass., writes, "Have been eating common sunflower seed and can see considerable benefits." Frances Berking of New Hope, Pa., writes, "Since reading your fine article "Sunflower Seeds—the Forgotten Food", I took your advice and have been eating some each day for almost two months. The results are amazing. Everyone remarks on the change from a tired, harassed war worker to a healthier, happier looking girl."

These are only a few cases and by themselves don't prove anything but taking them along with the cases described in the original article they take on a little more importance. We expect to hear of many other health improvements to people this fall, when the new crop of organically grown seeds is used.

Piling Harvested Heads

When small quantities of sunflower plants are harvested care should be taken that the heads are not piled one on top of the other as they will become wet and rot. Spread them out where birds will not get at them. Some people cut each head off with about a foot of the stem attached. They are then able to tie the heads by their stems to the rafters. They should not be threshed until dry. Threshing may be done by hand, curry-comb or other improvised tool.

Increasing Chemical Fertilization With Decreasing Crop Production

A series of articles by the famous leader of The School of Living, Suffern, N. Y.

BY RALPH BORSODI

Part 5

THE results of numerous laboratory and field experiments have convinced nearly all agricultural scientists of the desirability of promoting the use of chemical fertilizers. They in turn have convinced most farmers that the application of chemical fertilizers improves the soil, increases crop yields, and adds to the profits of farming. But the facts of the matter are that the record since the introduction of chemical fertilizers has not borne out these promises. Actual farming results in the United States, as shown by statistics covering the 60-year period since chemical fertilizers became popular, show no general improvement in yields per acre. On the contrary, *on most crop yields per acre have declined,* in spite of the increasing use of chemical fertilizers and despite the fact that the only statistics available include the large first yields from all the millions of acres of new and virgin soil first broken to the plow during this period.

Table 2 is a comparison of two periods of 30 years each, the first beginning with 1880 (when chemical fertilizers began to be used in significant quantities) and ending with 1909. During this period the average consumption of chemical fertilizers, in manure equivalents, on all the crop land in the United States averaged 154 pounds per year per acre. During the second period of 30 years, from 1909 to 1939, the average consumption increased to 586 pounds per year per acre. This enormous increase, especially since it accompanied great scientific and mechanical improvements in all other departments of agriculture, ought to have produced some general improvement in crop yields. But if the production per acre of our most important crops during these two periods is compared, the conclusion is inescapable than in spite of a 280.5 per cent increase in the use of chemical fertilizers per acre of crop land, there has been no general increase, but on the contrary *a general decrease in the efficiency of our agricultural production.* The modern farmer, in spite of the great extent to which he has followed the instructions of agricultural authorities with regard to chemical fertilizers, poison dusts and sprays, tractors and machinery, specialization and so-called scientific farming, is not increasing but actually decreasing the amount of produce he is getting from his land. It is not up to the critics, but up to the advocates of chemical fertilization, to explain this anomally. If chemical fertilization represents progress, then this progress should manifest itself in one or more of three ways: in increased yields, in greater profits, and in improved soil conditions.

With the exception of oats, Table 2 makes it very clear that there has been no increase in general yields on seven of our most important crops during these two periods. On wheat, there was practically no change —an increase of less than one per cent. On cotton, which has been most extensively fertilized with chemicals, there was an actual decrease of half of one per cent. On hay, rye, corn and barley the decreases ranged from 0.8 per cent to as much as 7.9 per cent. The commercial fertilizer industry, as well as most agricultural authorities, may contend that chemical fertilizers have not as yet been used in sufficient quantities to effectively increase yields. But there is con-

vincing evidence that neither larger applications of the present popular inorganic fertilizers nor the use of mixtures containing the so-called secondary nutritive elements will really benefit agriculture. The average increase during the two periods in the use of chemical fertilizers was 280.5 per cent, but if the consumption at the beginning of the period in 1880 is compared with the consumption at the end 60 years later, we find that the increase was approximately *five hundred per cent per acre greater in manure equivalents.* If a 500 per cent *increase* in the use of fertilizer is followed, for instance, by a 0.5 per cent average *decrease* in yield of cotton, how much more fertilizer will the cotton farmer have to use before he gets back to producing as much as he did 60 years before? Where will he get (out of the price he receives for his cotton) all the money he will have to pay for fertilizers if he is to buy enough of them to really increase his present yield?

This brings us to the question of farm profits before and after the introduction, and rapid increase, in the use of chemical fertilizers. Agricultural statistics demonstrate that even in the regions using the greatest amount of fertilizer, there has been no profit to the farmer in the growing of corn, oats, wheat and cotton. Grain crops show an average loss of 15 to 23 cents per bushel during the 10-year period between 1928 and 1937. The profit in cotton for this decade was almost negligible since the excess per pound over cost of production averaged only one mill. In the years 1937 and 1938, an average of from one to six cents per bushel was spent on fertilizers by the farmers of the whole country on grain crops and slightly less than one cent per pound on cotton. Cotton farmers apparently are spending nearly 10 times as much for fertilizer as they average in profits on their crop. Grain farmers lose money, in spite of their expenditures for fertilizers. The statistics show that losses on crops were considerably larger in the Northern and Southeastern states where fertilizer expenditures averaged much higher than the average for the rest of the country. There is no adequate evidence taking everything into account which shows that increasing fertilizer expenditures increases profits. On the contrary, the evidence indicates that *increasing* fertilizer expenditures accompanies *decreasing profits* and *increasing losses.* Of course the fertilizer industry, many agricultural authorities, and farmers generally will interpret these losses in terms of poor market conditions, drought and bad weather, and other factors not having to do with fertilization. It is in the opinion of the School of Living, impossible to isolate the cause involved, but it is possible to argue from the record that no adequate evidence has been produced to prove that the increasing use of chemical fertilizers increases profits generally and over the long run.

It is, however, possible to show such profits from the intensive use of chemical fertilizers on individual farms and tests, *if the long run effect upon the soil is ignored.* There is no doubt about the fact that chemical fertilization enormously speeds up the rate at which the original humus in the soil can be extracted. But if the capital value represented by the original condition of the soil, is rapidly converted into cash, the net "income" from this process is not a true profit from the honest working of the land. It is really a monetization of the fertility of the soil by the present generation at the expense of future generations. To get the true profit, the soil depletion would have to be deducted from the so-called profit. Chemical fertilizers, on the record of individual farms, seem admirably adapted to enable "business" farmers to exhaust the fertility stored in the soil during milleniums of time, and to leave a depleted, eroded and mineralized land to their descendants. This is in substance the moral to be drawn from the study of Table 4 and is the answer which the record forces us to make to the final test of the effect of the invention of chemical fertilization, "Has the use of chemical fertilizers improved soil conditions?"

If the production per acre of our most important crops during the 30 years between 1910 and 1939 on all the crop land in the United States, is compared with the average production in the 30 years previous to 1910, (between 1880 and 1909), the conclusion is inescapable that in spite of a 280.5% increase in the use of chemical fertilizers per acre of crop land, there has been an actual decrease in the efficiency of our agricultural production. (It should also be borne in mind that the yearly production figures used in this table cover the entire United States and do not therefore correctly represent the decreasing production because of the large areas of new land and virgin soil broken to the plow every year during this period.) The modern farmer—in spite of all his chemical fertilizers, his poison sprays, his tractors, his machinery, his specialization and so-called scientific farming—is not increasing but actually decreasing the amount of produce he is getting from his land.

Table 2.

	30 Years from 1880 to 1909	30 Years from 1910 to 1939	Average Increase	Average Decrease
Average Consumption of Chemical Fertilizers (in manure Equivalents) on all U. S. Crop Land (in pounds per acre)	154.0	586.0(2)	280.5%	
Oats (bushels per acre) (1)	28.0	29.4	5.0%	
Wheat (bushels per acre) (1)	13.7	13.8	0.7%	
Cotton (pounds per acre) (1)	183.9	183.8		0.5%
Hay (tons per acre) (1)	1.29	1.28		0.8%
Rye (bushels per acre) (1)	12.8	12.5		2.3%
Corn (bushels per acre) (1)	26.4	25.3		4.2%
Barley (bushels per acre) (1)	23.9	22.0		7.9%

(1) These averages were obtained by weighting the yearly average yields per acre according to the total acreage harvested as reported in "Agricultural Statistics, 1940," U. S. Dept. of Agr.

(2) Based upon average consumption of fertilizers for the period between 1910 and 1935.

Tantalizing Japanese Beetles

Having been annoyed by the attacks by Jap beetles upon my choicest flowers, I decided last season to do something about it. As most gardeners know, the beetles select fine dahlias and gnaw them to shreds in short order. They prefer the white or light colored ones and especially the prize specimens.

As part of the war on the pests, I devised a protection for my flowers that tantalizes the Jap beetles and foils their dastardly attack. The idea is worth passing on to other gardeners, for it is practical and inexpensive; in fact it has not cost me a cent.

The device is a cellophane hood that I place over the buds. For a small bud, the covering from a pack of cigarettes is just the right size. For a large bloom, the cellophane wrapping from a cake or a loaf of bread is perfect. I cut the end from the wrapping, drop it over the blossom and close it over the stem by a bit of string or a paper clip. The beetles do not seem to have the intelligence to creep in under but bounce off the surface and go elsewhere—to the beetle traps, I hope!

The transparent hood does not disfigure the garden. The colors of the blossoms shine through and, when the flower is cut, the hood may be used over and over again. Having tried it last season, I know it is effective protection.—C. L. Edholm — *The Home Garden* (N. Y.)

Home Canning

"There is available today no chemical preservative which is satisfactory for home canning either as the sole agent used or as an adjunct to rapid heat processing methods," the Council on Foods and Nutrition of the American Medical Association advises in a report published in *The Journal* of the Association for June 3.

"The primary danger of such methods," the report continues, "lies in their ineffectiveness as sterilizing procedures, while the possibility of toxicity, although not great, must be kept in mind where such foods are consumed in sufficient quantities. The fact remains clear that, for proper home canning, reliance must be placed on careful attention to sanitary precautions and adequate methods of heating, with pressure cooking equipment for meats and vegetables and thorough cooking of fruits for the proper length of time as recommended in authoritative publications such as those of the U. S. Department of Agriculture or the various state extension services."

New Zealand Box

THE New Zealand Box was first used in New Zealand and consisted of a one section affair, with slats having about half-inch spaces to allow for aeration. When the material had to be turned, it was first thrown out of the box and then placed back in again. This was extra work, so a three section box was designed. In this box the material was placed from the first into the second section. A new charge of material was then placed in the first section. When it was time to remove the second section material, it was placed into the third section, the material from the first was placed in the second section and a new charge was placed in the first. Thus there was a continuous process.

The materials, green matter, manure, earth and lime is piled into the box in exactly the same manner as an outside compost heap until the section is filled to the brim. The first change into the second section is made in a month. Naturally, what is on the top goes on the bottom of the next section. In another month the next change is made so that it becomes a monthly process. On a certain day each month, the changes are made.

On our farm we found that by the time the first batch is to be transferred it has become compacted by about 40% so that the second section is smaller and the third section is still slightly smaller.

In the photograph we will call the first big section near the front A. The next two sections which are together are B to the left and C to the right. The next two sections are D to the left and E to the right. The last section is F. Mark these letters on the picture. This box is a double one. That is, new charges are placed in A and F. When the first change is made A is transferred into C and F is transferred into E. In the next change C is placed in B and E is put in D. In thirty days the matter in both B and D are finished.

There are several points about this box which should be noted. When A is transferred into C, there may be some matter left over. This is to be placed on the top of the matter in F. It is best, therefore that when the change-overs are made, A, B and C, should be handled in one day, and the three remaining sections D, E and F the next day. In this manner if there are any overages they can always be placed into the opposite box. In terms of percentage C should be about 65% of the cubic content of A, and B should be about 75% of C.

The box is four feet in height and section A is four feet square. These sections may be made larger or smaller. Another very important point is that on one side of each section the slats are

removable. In sections A and C the removable slats are on the right side. In section B and D they are on the left side. In F they are on the right. These slats are removable, (they slide up and down) so that the material may be more easily emptied out of them. In section B you can see how the slats rest between the sliding posts.

Please note Ruth Rodale, the editor's daughter, holding a cover. There is a cover for each full section. (B and C would have one cover). These covers are made with a wooden frame, covered with 1/2 inch mesh wire, covered with burlap. This permits the rain to go through without too dashing an effect. It also keeps out the drying rays of the sun.

We have found that a box like this turns out better compost than an ordinary outside heap.

Threshing Sunflowers

THE picture reproduced in this article appeared in the "American Agriculturist" of Sept. 26, 1896. It may have some value to those who have large quantities of sunflower heads to thresh. The instructions that came along with the picture were as follows:

"The axle should roll on friction wheels. This disk is prepared for its work of detaching the seed by driving nails thru it near the periphery parallel to the axis and allowing them to project about half an inch on each side. The width of the band of nails should be about 6" and the nails should be thick enough so that the finger cannot be inserted between them. The ends of the nails should all project the same distance. The perimeter of the wheel should be secured by a heavy tire of iron, in order to hold it in shape and prevent it from warping. This heavy iron tire also acts as a fly wheel helping to secure uniformity of motion. The wheel revolves toward the operator. When the wheel is in full motion a sunflower head is held in each hand and pushed for an instant against the protruding nails on either side. In a very short time all the seeds will be detached. 12 to 15 bushels an hour may be threshed with practice."

Sunflower Plants on Our Farm

THIS is a picture of a small patch of sunflower plants many of which were 15 feet high. The heads keep on growing after the stalk reaches its maximum height and get to be more than 12 inches across. The seeds were sewn about May 15th and picture was taken August 15th.

The reason for these large plants is the organic treatment of the soil and also the thin spacing, (about 3 feet both ways). Not only did we use a liberal amount of compost but in addition we used dried blood, bone meal, ground phosphate rock and ground limestone. Many people marveled at these plants stating they had never seen anything like it. The actual seeds themselves are quite large, making it worthwhile shelling each one for personal consumption.

The other day, August 24th to be exact, we went on a three day trip. When we returned we found that the birds had been eating out the seeds and on some heads about 10% or more of the seeds were gone. We couldn't harvest them yet as they weren't quite mature so we struck on the expedient of tying each head with cheese-cloth. At this writing only one day has elapsed so we do not know how it will work out.

Those of our readers who did not read the original article describing the wonderful advantages obtained by persons who have eaten sunflower seeds may receive a free copy of the article by sending a stamped self-addressed envelope.

Sani-Soil Does Not Discourage Earthworms

SEVERAL readers seemed to have questioned the use of sani-soil (which is advertised in this magazine) as a mulch, in that they claimed it had an undesirable effect on earthworms. When the matter was brought to the attention of the makers of Sani-Soil, the Redwood Fibre Products Co., they stated that this is not so. Sani-Soil consists of the shredded bark of the giant California redwood tree.

When earthworms are kept in boxes made of the redwood itself, there was a definite inhibitory effect on the worms. But when

earthworms come in contact with sani-soil, which is made from the redwood bark, the company claims there would be no detrimental effect.

We submitted the matter to Dr. Thomas J. Barrett, of the Earthmaster Farms, Roscoe, California, who reported under date of July 24, 1944, as follows:

On July 15, 1944, I mixed a batch of earthworm food as follows: 1 part Sani-Soil (2 quarts by volume); 1 part granulated peat moss; 3 parts rabbit manure, topsoil and roughly ground alfalfa. Material was intimately mixed and thoroughly impregnated with water.

The material was used in an earthworm culture bed of 36 inches square surface area, containing several thousand earthworms. Material was spread on one-third of the surface to a depth of approximately 1½ inches deep. Observations have been made daily since making the setup.

Within 24 hours I found that the worms had worked their way into the test material in great numbers. At date of this writing, the test material has been quite completely broken down by the worms. I find them in good condition and apparently thriving on the mixture containing the Sani-Soil.

From this test, I am led to conclude very definitely that Sani-Soil is not toxic to earthworms and that it does not repel or interfere with their activity. I am very glad to be able to make this report, as redwood is a most valuable material in the construction of rot-resisting culture beds, as well as being a most valuable mulch in products such as Sani-Soil.

Very truly yours,
Thomas J. Barrett.

SUGGESTS RAISING SOYBEANS IN GARDEN

One of the easiest ways to become acquainted with the soybean, the latest valuable addition to the American dietary, "is to raise it right in your own garden," George K. Anderson, M.D., Chicago, advises in the July issue of *Hygeia, The Health Magazine*. "It lends itself readily to cultivation on a large or small scale and has been found to be one of the hardiest of crops. In the face of droughts which dwarf most other types of vegetables, the soybean continues to grow as usual. Those who have grown soybeans in home gardens are enthusiastic about this crop. It produces a yield two or three times greater than any other types of beans and may be made to provide a continuing supply of the green vegetable throughout the growing season. This is readily accomplished by planting varieties which mature at different periods. When the beans are picked, with the pods fully developed but still green, the shelled beans serve as a fresh green vegetable for table use and taste much like fresh lima beans."

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EARTHWORMS IN CHINA

ON another date earlier in May we were walking in the fields without an interpreter. For half an hour we stood watching an old gardener fitting the soil with his spading hoe. Angleworms were extremely numerous, as large around as an ordinary lead pencil, and, when not extended, two-thirds as long, decidedly greenish in colour. Nearly every stroke of the spade exposed two to five of these worms, but so far as we observed, and we watched the man closely, pulverizing the soil, he neither injured nor left uncovered a single worm. While he seemed to make no effort to avoid injuring them or to cover them with earth, and while we could not talk with him, we are convinced that his action was continually guarded against injuring the worms. They certainly were subsoiling his garden deeply and making possible a freer circulation of air far below the surface. Their great abundance proved a high content of organic matter present in the soil and, as the worms ate their way through it, passing the soil through their bodies, the yearly volume of work done by them was very great. In the fields flooded preparatory to fitting them for rice these worms are forced to the surface in enormous numbers, and large flocks of ducks are taken to such fields to feed upon them.—*Farmers of Forty Centuries*—By F. H. King.

WILD VITAMINS

If any one thing has been overdone in recent months it is the vitamin business, which purports to put out the answer to health and vitality in capsule and pill form. A proper diet, such as most Americans can easily have today, will supply the needed vitamins. Nor are these essentials to health confined to the cultivated fruits and vegetables. Agricultural experiment stations have been studying the vitamin qualities of wild plants. They have found the buffaloberry even richer in Vitamin C than the citrus fruits. New Hampshire-grown wild blueberries, eaten raw, also contain a good supply of the same vitamin. Mangoes rank with canned tomato juice in their vitamin content, and peanuts are recommended for thiamine as well as their protein value. Wild rice contains several B vitamins, as do the common field mushrooms.—*Nature Magazine.*

Reader's Correspondence

Please write on one side only. Do not make your letters too long. Put each different query on a separate sheet. Send stamped, self-addressed envelope for reply.

LEAVES

Dear Sir:

We have a little over an acre, wholly developed in lawns and flower beds. Back of our garage we have a triangular corner, measuring, perhaps, twenty feet each way, where we store all waste vegetable matter that comes from our place and some we are able to salvage from the neighbors.

Since we have many large maple trees great quantities of leaves accumulate in the fall, and again in the early spring, when mulches are removed and the annual spring clean up made. To care for these we were compelled to dig a pit three or four feet deep, *tramp the leaves down tight,* and even then, a pile arises eight to ten feet high.

These leaves decay very slowly, requiring about three years, and even more with dry seasons. To keep such a deep pile saturated is difficult, and expensive, with our water rates. We turn the pile, spring and fall (the only seasons when labor can be had for such work), or decay would take even longer.

To spread all this matter out as per your directions, would cover far too large an area. Space is just not to be had. Likewise, top soil is simply not available. Our soil is thin and to take enough for all this matter, there would be few flower beds left. To bring it in from outside, is too expensive, and besides we have no place to store it. The same applies to manure. Hard to get, cost prohibitive, no room to store.

On every eight to ten inch layer we sprinkle finely ground limestone, using this in preference to hydrated lime, since we understand there is no danger of using too much ground lime.

George Mather,
Westminster, Md.

Answer

Dear Mr. Mather:

Replying to your letter of June 25th, you bring up one of the most difficult questions of organic farming and gardening—what to do with leaves. One of the mistakes that is usually made is to pack these leaves too tight, thus preventing aeration.

It is best, therefore, if you want to let leaves decay, to put them in layers with weeds; alternating thin layers of weeds and a thin layer of leaves. However, regardless of how difficult it would be, you should get some animal matter, as little as it might be, as an activator. Possibly some bone meal or dried blood. If you used a little animal manure it would not smell if you followed the Howard method.

There is no question that leaves are the finest form of green matter, because the tree roots go down as far as 20 feet, and bring up in the leaves rare elements found below. But just because you have so many leaves does not mean that you should use them all if you are having difficulty handling such large quantities. It might be best to get some weeds to go with them, and give some of your leaves away.

We have been thinking of applying friction to leaves in some manner to get them to pulverize. We are going to experiment this fall with something about the size of a large butter churn. After the leaves dry somewhat, we will place them in this churn and by turning see if they will pulverize. There are grinding machines that could do this job, but I believe the power factor would be the stumbling block. You are right about ground limestone being superior to hydrated lime.

We have seen the value of good compost, and our advice to you would be to make regular compost heaps, using some kind of an animal activator, thus having less total tonnage perhaps, but you will have a potent fertilizer material. Real compost is much more than a sponge in the soil, it is a true fertilizer.

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COMPOST — BUGS

Dear Mr. Rodale:

The holiday gave me time to read your splendid recent issue of the Organic Gardening magazine, and I note your request for composting results. Some months ago you asked me for results with composting here, as neighbors warned me that the heap draws and harbors sow bugs and other pests. A friend suggested that if we mix lime and chicken manure evenly through the heap, that effectively takes care of the pests, so I made one heap last fall, and another heap

this spring with this problem in mind, and in each case I had a small portion of the heap not mixed with lime and chicken manure, and although this section of the heap was full of sowbugs, they were strictly limited to this portion of the heaps, without the least spreading to the rest of the heap. After taking both these heaps through till they were fully developed and ready to spread, I thought this item worth reporting to you by now.

It seems that many fear the accumulation of fly maggots and other pests, but that means they are judging by their past experience in improperly accumulated wastes, and emphasizes the importance of their securing and carefully following the instructions on COMPOST—How to Make It.

H. Skadsheim,
Sanitarium, Calif.

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MECHANICAL METHODS

I have an idea, which may be worthless as I am not mechanically minded. I have two compost bins. *If those bins only had some kind of turnable so that they could be dumped bottoms up into each other a lot of labor would be saved. As it is, it means a lot of hard shoveling.*

Mrs. M. Rea,
Clearwater, Fla.

Answer

Your suggestion about a turnable is very interesting, and perhaps one of our enterprising readers may experiment with it.

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SAWDUST

I should like to know if there is a special method of turning sawdust into compost. I know it takes much longer. There is a huge pile from an abandoned mill near here, and while with labor at 65 cents an hour when obtainable it would not pay, later I may get some.

Mrs. Margaret Rea,
Clearwater, Fla.

Answer

Sawdust may be included in the regular compost heap to an extent not over 5% of the amount of materials in the heap. But Sir Albert Howard advises that in working with sawdust, in addition to putting it in the heap, he also puts it on the ground around the heap, perhaps 5 or 6 inches deep as it will gradually decay there. If you put sawdust in a thick heap it would take many years for the inside to decay.

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COMPOST — EARTH

Dear Sir:

I would appreciate it very much if you would tell me what purpose the soil serves in making compost. If it is used to introduce bacteria to hasten decomposition, *why would it not be better to save a portion of the material previously composted and add that instead?* In asking this question, I of course am not referring to the layer of earth placed over the pile.

R. F. Deane,
Arcadia, Calif.

Answer

Dear Mr. Deane:

The soil is used in making compost to act mainly as a neutralizing base; that is, together with the lime it acts so that the compost will not be acid. Of course, the soil also contributes some bacteria and fungi. Your suggestion to include finished compost in the heap as an activator, is a good one too.

GRAPE VINES

Our grape vines are about 15 years old. Every year they seem to come in good foliage, and just as soon as the vines start to produce the small grapes, there is a heavy rust like deposit spreads on all the foliage, and by the time the grapes reach maturity, better than 75 per cent of them turn black and shrivel up. For the past two years, since learning about the Compost fertilizer, we have been applying generous amounts to the grapes, the results have been an increased growth of the vine and foliage and also a tremendous increase in the fruit, but as in past years a good 75 per cent of the fruit turns black and shrivels like a raisin.

We were seriously thinking of taking the vines up and resetting them with compost instead of earth. However, before doing this, we thought it advisable to ask you about it.

J. A. Hoegger, Jr.,
New Milford, Pa.

Answer

With regard to the vines, it would seem that they are badly infested with a mold disease known as black rot. Here you are confronted with a very serious and difficult condition, one which will take time to clear up. We would recommend the following program:

This fall, after the leaves have fallen, the area surrounding the vines should be thoroughly cleaned up, all leaves, shrivelled fruit, etc. removed. The ground should be plowed or dug. The vines should be drastically pruned (all prunings entirely removed) to open them to sunshine and the free circulation of air. It would not seem advisable to uproot 15 year old vines, but if properly composted material is available a heavy mulching (at

least six inches deep) will work wonders. All old wood of vines should be dusted with wood ashes. The important point to bear in mind is that the vines be *thinned out,* that anything which tends to over crowd, throw shade, or cause air stagnation be removed.

In the Spring, when the third leaf shows, the vines should be dusted with finely powdered wood ashes preferably *before* rain, and given a dusting about every two weeks until the end of July.

We are glad to hear that you had such fine results with compost. With us, our vines responded very surprisingly to clean cultivation followed by compost mulches.

Answered by
Roger W. Smith.

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JAPANESE BEETLES

We are having considerable amount of trouble with grubs in our lawn, *plus plenty of Japanese beetles.* This is the first year that the beetles have amounted to anything, but from the looks of some of our shrubs and grape vines, they are surely making up for lost time.

It was suggested that we spread lead arsenate powder (10 *pounds of lead arsenate powder to* 150 *pounds of sand*) *on our lawn.* After thinking this idea over, it struck us that if the lead would kill the grubs in the lawn, in all probabilities, it also would kill all the earthworms at the same time. We might mention here that the way we have discovered that grubs are in our lawn is that the skunks are having a fine time ripping it all up. We would more than appreciate it if you would have any suggestions on how to cope with this situation.

J. A. Hoegger, Jr.,
New Milford, Pa.

Answer

Dear Mr. Hoegger:

In reply to your interesting letter of August 5th, it seems likely that the grubs which infest your lawn are the grubs of the Japanese beetle. We would not recommend the use of lead arsenate because it is a chemical poison which at a later date might be picked up by vegetation growing in the treated area in sufficient quantity to render this vegetation unfit for consumption. Probably the best plan would be to take a rather long range view rather than attempt instant eradication of the pest. A heavy application of lime might be followed a week or two later by a good layer of sifted compost humus. This will do much to discourage the grubs and encourage the grass, although some bare spots may have to be seeded this fall.

The Department of Agriculture has been obtaining good results in control by spreading disease to the beetles over a wide area. This medium has not yet been made available to the public for private use as far as we know. However, the Bureau of Entomology of the Dept. of Agriculture, State of Pennsylvania, might be glad to receive your request. Apparently the use of this medium on a small scale is not yet practical.

Answered by
Roger W. Smith.

BERRIES

Dear Sir:

My red raspberries have the prevalent Mosaic. Will feeding the roots with good compost cure this? The Farm Bureau says there is no cure. We dug in rotted manure, not compost last year and had a heavy crop, but lots of them dried up.

Elizabeth P. McHarg,
Ridgefield, Conn.

Answer

Dear Mrs. McHarg:

With the various kind of berries, a good mulch is the most accepted practice, putting compost under the mulch. The various berries like a somewhat acid condition and it might be a good thing to make the compost for your raspberries without using lime.

●

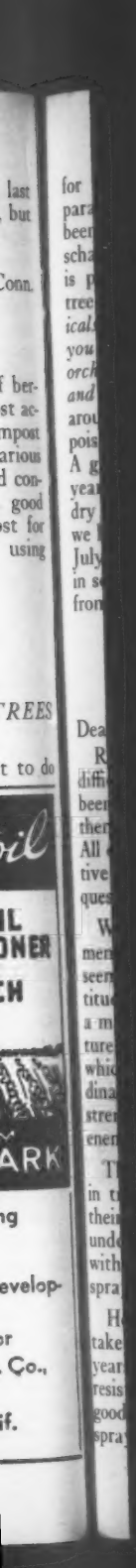
ORCHARDS—PEACH TREES

Dear Mr. Rodale:

Could you tell me what to do

- Cuts Down Watering
- Saves Cultivation
- Reduces Weeding
- Improves Root Development

Ask your dealer, or
Redwood Fibre Prod. Co.,
Dept. O.,
Santa Cruz, Calif.



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for peach borers? I have tried paradichlordenzene and it has been suggested that I try paraschalecide, which is a liquid that is poured on the trunk of the tree. *I understand that chemicals should not be used so hope you know of other remedies. The orchard has never been sprayed and only ashes* have been put around the trees except this poison for borers two years ago. A great deal of fruit rotted this year, of course we had a long dry spell in May and June and we have had too much rain since July 10. These borers are so bad in some trees that wax is flowing from the last pruning cuts.

F. L. Suttles,
Greensboro, N. C.

Answer

Dear Mr. Suttles:

Regarding peach borers, it is a difficult question. You have not been able to rid your trees of them even by using chemicals. All of these chemicals are a negative way of approaching the question.

We know that ashes are recommended for peach trees; they seem to be a specific; yet, our attitude is that ashes are too strong a material to be used in agriculture. They contain sulphites which kill off bacteria, which ordinarily would help the tree to strengthen itself against its enemies.

The only way to get strength in trees, so that they can resist their enemies, is to put compost under your trees and to cover it with a heavy mulch, then not to spray any chemicals.

However, it would probably take anywhere from two to four years to give the tree the proper resistance, so that it could grow good fruit without chemical sprays. That is the problem.

A mulch in your orchard would introduce earthworms; that is the most natural way of getting them.

●

FOREST SOILS

Dear Sir:

I have come across some wonderful land. The topsoil *has* 2" *of rich peat, followed by* 5" *of rich grayish soil,* and below this, sand and soil. This land, once a forest, has never been plowed, is now covered with medium sized hard-wood trees. The ground is rich, yet I dug in a number of places, however, *no worms were found.* Do worms have to be planted in this ground, or would you say the ground lacks something.

Elmer E. Miller,
Chicago, Ill.

Answer

Dear Mr. Miller:

This is in reply to your letter of August 7th. The question is a most interesting one. There is a logical reason why forest soils do not contain earthworms. In a great many cases it is because forest soils are acid, and earthworms must have a neutral or alkaline medium to live happily. That is why chemical fertilizers kill them or drive them away. They are so acid.

Nature has many tricks up her sleeve, so that in the forest she is more dependent on bacteria, fungi and other organisms for breaking down organic material.

●

FALL PLOWING

Dear Mr. Rodale:

My problem right now is the fall treatment of the garden. I would like to have it plowed this

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fall because I never can get started as early in the spring as I would like to because I have to wait until the farmers begin to get into town to plow gardens generally. What is your opinion?

Mrs. H. W. Kofsky,
Oberlin, Ohio.

Answer

In many cases when land is plowed early in the fall, a heavy cover of weeds soon grows up which requires plowing again in the spring. If it is plowed very late in the fall it leaves the ground bare, subject to washing. Application of a light mulch, two or three inches thick after plowing would be the answer. When this mulch is raked away in the spring it will leave a nicely conditioned soil ready to use.

●

APPLE POMACE

Gentlemen:

I notice you have an article stating that Apple Pomace makes a good fertilizer. I would like to know if apples, rotten or otherwise, will make a good fertilizer? If so please let me know how to use them for I have a lot of falling apples that just rot.

Dr. C. T. Womack,
Martinville, Va.

Answer

Dear Doctor:

Apples may be included in the compost heap, and they will decay very easily. They should be used as green matter in the 6 inch layer, and it probably would be best to mix some green matter along with the apples.

●

FLIES AND COMPOST

Dear Sir:

I have several horses, cows and plenty of flies on my ten acres.

Several years ago I came across a "Compost" in Monterey, Calif., and the owners said they never had a fly. I would like to know why they did not?

C. W. Brown,
San Diego, California.

De La Mare Garden Books

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Organic Gardening — Emmaus, Pennsylvania

Answer

Dear Sir:

There is no question that ordinary manure will attract flies. But when you make compost heaps by the Sir Albert Howard process, you will not be troubled with them. Flies like smelly manure. There should be no odor from a well-made compost heap otherwise something is wrong.

There is a certain kind of lilly, called the Carrion Lilly that has a peculiar animal and manure like odor. It seems that in the process of pollination of this lilly, only flies do the work, as other insects will not go near it.

●

HUMUS AND SOIL TEMPERATURE

I feel that a step of great importance is the right use of the compost after it is made, or the right handling of organic matter where flat composting is followed. I suppose heap composting fits gardening, while flat composting fits large scale field farming, and altho the method is different the principles are the same. For example, a short time after a compost heap is formed, the heat is raised to 150 degrees, which increases the speed of both the fungous and bacterial action on the material, as well as other chemical reactions that may be involved, as everyone knows who has taken any studies in chemistry and performed laboratory experiments. The organic matter become heated by the sun when left on top of the ground, and it begins to turn dark color, which increases the absorbtion of heat. It is when man's artificial methods enter the picture, and this organic matter is plowed under completely, with a layer of light colored clay on top which absorbs no little heat, but has high conduction of temperature, giving off heat faster from the soil than if the humus is left on top of the soil. Humus has tremendous heat insulating capacity, so the heat it absorbs from the sun if it is left on top of the soil, is very effectively conserved in the soil. This is very important in the early spring or late fall, when heat is so important a factor in the growth and maturing of such crops as corn, tomatoes, sweet potatoes, soy beans, etc.

H. Skadsheim,
Sanitarium, Calif.

●

MULCHES — FLOWERS

Gentlemen:

In early July I spread a mulch of one to two inches of compost on my rose bed. Ten days later the lower leaves of the roses began to turn yellow and fall off. (The trouble was *not* "black spot," as I know black spot and have been able to eliminate it). I took off the mulch and the roses recovered. The compost had been made from oak leaves 18 months old, fresh horse manure and wood ashes by the "Indore" process. Although it was over 90 days old when I used it, it may not have been quite fully composted.

I had had exactly the same experience twice before using mulch at the same time. One year I used oak leaf mould 2½ years old, and another year I used tobacco stems, with the same bad results.

F. B. Gerhard,
Summit, N. J.

Answer

Dear Mr. Gerhard:

Regarding your mulch on rose bushes no doubt your trouble was that rose bushes like it neutral—not too acid and not too alkaline. Perhaps your mulch was too alkaline, perhape even too acid.

Mulches have been definitely proven as being very fine for vegetables and fruit and general farm crops, but I have heard on various occasions that certain kinds of mulches on flower beds have not worked out. Until more work has been done in this field, one must approach it very carefully.

●

LOAM

Since childhood, I have always noted that every seed house printing instructions on seed packages, emphasized that to insure success with their seed, you must sow them in *loamy soils*, but not till Organic Gardening Magazine came along with the instruction on how to make compost or organic material to make the soil loamy, were the problems possible of solution. In our laboratory, we found by actual experiment that humus was seven times as efficient in absorbing moisture as some of the soils we had. We also found its capacity of retarding evaporation many times better than the minerals, and that they warmed up earlier in the spring both because of the slow evaporation and the black color that absorbed more heat from the sun. The one thing that was always lacking in all this valuable knowledge was how to supply the humus, and that is the instruction your publications on composting now gives us.

The next important step is the health angle of the organic program, and I am getting a number of doctors intensely interested in that feature of your program.

H. Skadsheim,
Sanitarium, Calif.

AN AGRICULTURAL TESTAMENT

By Sir Albert Howard, C.I.E., M.A.
Formerly Director Institute of Plant Industry Indore, and Agricultural Adviser to Central India and Rajputana.

SIR ALBERT HOWARD C. I. E., M. A.

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Emmaus, Pa.